



Archaic artifacts resembling celestial spheres

S. Dimitrakoudis, P. Papaspyrou, V. Petoussis, X. Moussas

Section of Astrophysics, Astronomy and Mechanics,
Department of Physics, University of Athens
(st.seleukos@gmail.com, panpapasp@yahoo.com,
xmoussas@phys.uoa.gr)

Received: 15/4/2006

Accepted: 27/10/2006

Abstract

We present several bronze artifacts from the Archaic Age in Greece (750-480BC) that resemble celestial spheres, or forms of other astronomical significance. They are studied in the context of the Dark Age transition from Mycenaean Age astronomical themes to the philosophical and practical revival of astronomy in the Classical Age, with its plethora of astronomical devices. These artifacts, mostly votive in nature, are spherical in shape and appear in a variety of forms, their most striking characteristic being the depiction of meridians and/or an equator. Most of those artifacts come from Thessaly, and more specifically from the temple of Itonia Athena at Philia, a religious center of pan-Hellenic significance. Celestial spheres, similar in form to the small artifacts presented in this study, could be used to measure latitudes, or estimate the time at a known place, and were thus very useful in navigation.

Keywords: Archaic Age, astronomical devices, bronze votive artifacts

Introduction

The 8th century BC was characterized by a general revival of Greek civilization, after the Dark Ages that followed the end of the Mycenaean Age. The Olympic Games were revived, new artistic standards arose, and a series of great epic poems were recorded, foremost of which were the Iliad and the Odyssey. In these early epics, including the works of Hesiod, we can see the first mentions of constellations and stars (Orion, Ursa Major, Bootes, Sirius, Arcturus, the Pleiades and Hyades) and the form of the universe, as perceived by those early Greeks (the Earth was con-

sidered to be flat, while the Heavens were disk-shaped, endlessly revolving around the still Earth). Colonies were continuously founded around the Mediterranean and the Black Sea, and Greek sailors would have to rely on observations of constellations for navigational purposes. In the Odyssey, Calypso instructs Odysseus to keep Orion on his left while sailing back to Ithaca, while Aratus (much later) mentions that Greek navigators used Ursa Major as a sign for the north.

One of the fundamental problems of navigation was finding the latitude and longitude of a place.

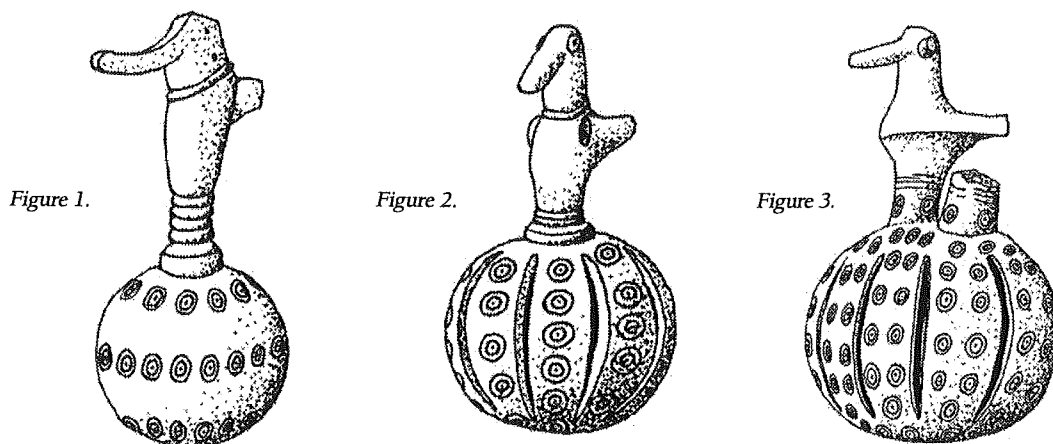


Fig 1: Bronze artifact, temple of Itonia Athena, 6.3cm in height (KD2002) **Fig 2:** Bronze artifact, temple of Itonia Athena, 5.2cm in height (KD2002) **Fig 3:** Bronze artifact, temple of Itonia Athena, 6.8cm in height (KD2002)

While the longitude problem was largely unresolved until the 18th century, latitude could be easily determined by a variety of instruments, ranging from graduated quadrant pitch circles, to more advanced astrolabes, that were developed in the Hellenistic Age. Those instruments relied on the observation of the Sun's shadow or the position of stars at a known time. In earlier ages the Sun's shadow was already used in sun-dials (dating from the 15th century BC in Egypt), while there is strong speculation that certain prehistoric monuments were aligned with the rising of the Sun or the Moon (e.g. Stonehenge). However, of the early Archaic Age little is known about the use of astronomical devices, either as recent inventions or as relics from the Mycenaean Age. An archaeological hint in that direction may be provided by certain bronze votive offerings discovered in Thessaly and other parts of the Greek world.

Votive artifacts

Archaeological excavations at the temple of Itonia Athena in Philia, a religious and political center of the Thessalian League, by D.R. Theocharis in 1962-67 (unpublished but mentioned in Kilian-Dirlmeier 2002), Angeliki Pilali-Papasteriou and Aekaterina Papastamou-Papaevthymiou (1983) in 1980, and Imma Kilian-Dirlmeier in 1997-2001 (Kilian-

Dirlmeier, 2002, henceforth KD2002), have unearthed a number of bronze votive artifacts, perhaps pendants, whose form resembles a representation of the celestial sphere, and may be indicative of a larger, more functional device. These artifacts correspond to a period in time when such offerings to the gods were very common (van Straten, 1992).

Of the numerous bronze artifacts discovered in that site, those that are sphere-shaped (and are dated at 750-575 BC) can be classified into three broad categories. The *first category* consists of objects whose main feature is a hollow bronze sphere, decorated with star-like symbols, and an upper extension in the form of one or two birds. Three artifacts of this type have been unearthed at the temple of Itonia Athena, with heights ranging from 5 cm to 7 cm. On the first one, the solid bronze sphere is decorated with three 'parallel circles' (Fig. 1) formed by star symbols (the astronomical symbol we still commonly use for the Sun). The second has seven meridian incisions (Fig. 2), in between of which the star symbols are repeatedly crafted. The third (Fig. 3) is similar to the second, only somewhat bigger, with ten meridian incisions, and two bird-shaped protrusions, as opposed to only one in the previous two artifacts.

The *second category* can be broken down into two sub-categories. The first one is represented by two artifacts. Their characteristics are a spherical

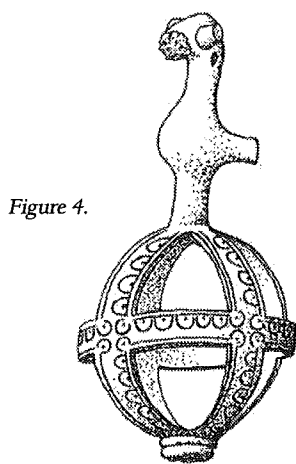


Figure 4.

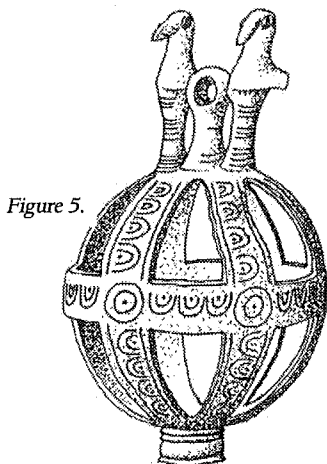


Figure 5.

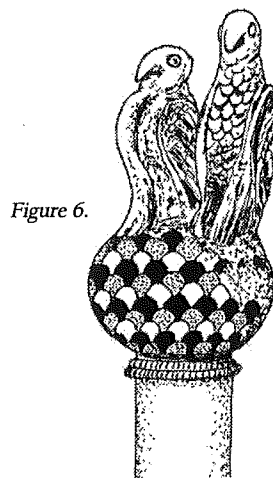


Figure 6.

Fig 4: Bronze artifact, temple of Itonia Athena, 7.8cm in height (KD2002) **Fig 5:** Bronze artifact, temple of Itonia Athena, 7.3cm in height (KD2002) **Fig 6:** 14th-13th c. BC Mycenaean golden scepter discovered in Curion (Cyprus) (from *Ιστορία του Ελληνικού Έθνους*, (1976))

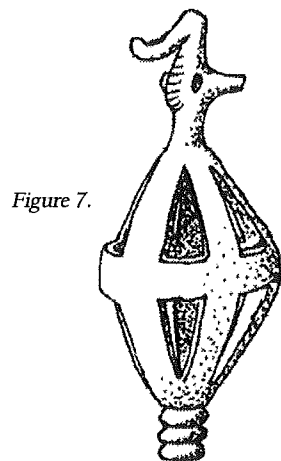


Figure 7.

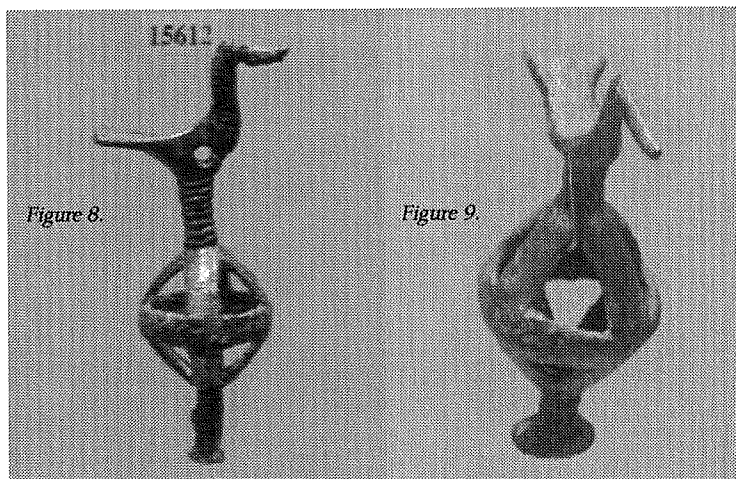


Figure 8.

Figure 9.

Fig 7: Bronze artifact, temple of Itonia Athena, 8.5cm in height (KD2002) **Fig 8:** Bronze bird on hollow sphere; late 8th – early 7th c. BC, Pherai, Thessaly (on display at the National Archaeological Museum of Athens) **Fig 9:** Bronze bird on hollow sphere; late 8th – early 7th c. BC, Pherai, Thessaly (on display at the National Archaeological Museum of Athens)

main body, made up of bronze foils that form an equator and four or six meridians (respectively), an upper part in the form of one or two birds (respectively), and a lower part, in the form of a hollow cylindrical extension, that perhaps fitted onto a pole (reminiscent of a 14th-13th c. BC Mycenaean scepter discovered in Cyprus, Fig. 6 (History of Greek Nation, 1976)). The foils are all curved (where not damaged), and they are decorated with the same star

(sun) symbols found on the previous artifacts (Figs. 4, 5).

These objects are the ones that bear the closest resemblance to the armillary spheres that were to become very common in subsequent centuries.

The second sub-category is the most numerous, with representative artifacts found not only at the temple of Itonia Athena, but also at temples of Zeus and Artemis in Thessaly, in Olympia, and Macedo-

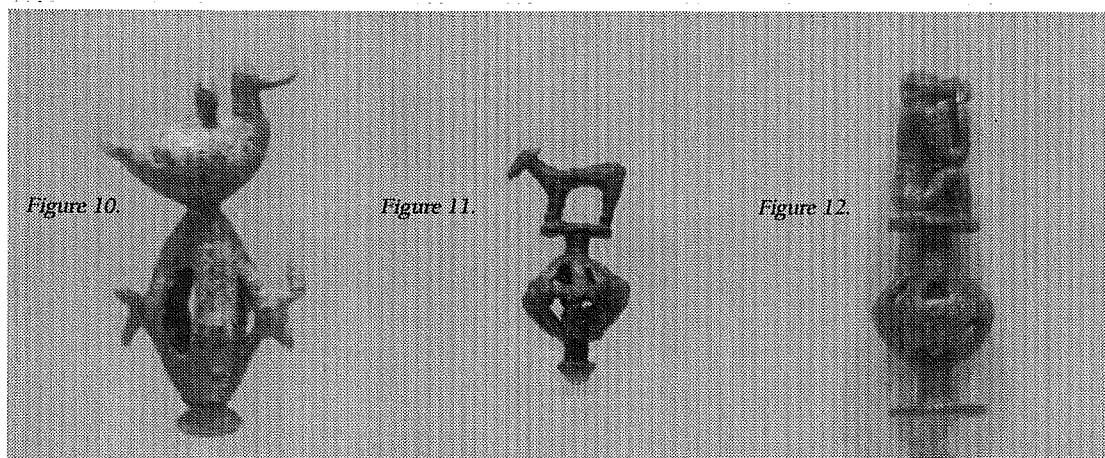


Fig 10: Bronze bird on hollow spheroid base; late 8th – early 7th c. BC, Pherai, Thessaly (on display at the National Archaeological Museum of Athens) **Fig 11:** 8th c. BC bronze artifact from Olympia; Peloponnesian workshop (on display at the Archaeological Museum of Olympia) **Fig 12:** Bronze pendant in the form of a hollow sphere with a human form, 8th c. BC; Macedonia (on display at the National Archaeological Museum of Athens)

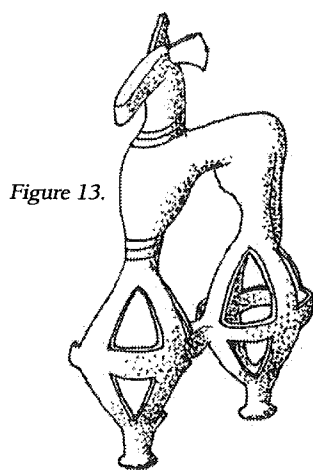


Figure 13.

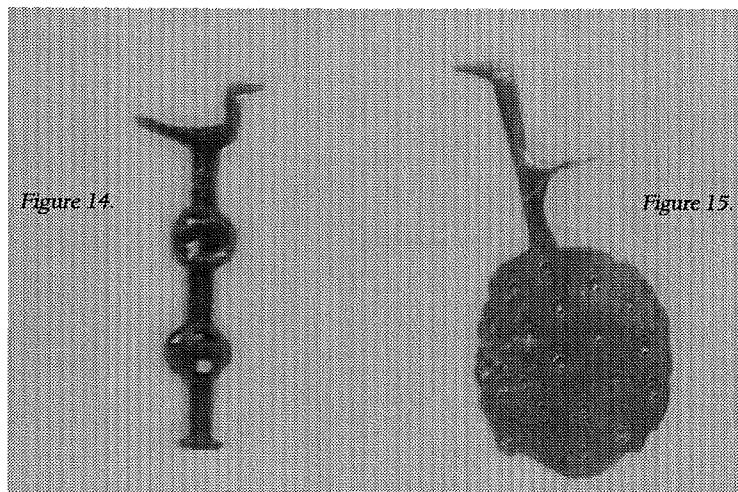


Figure 14.

Figure 15.

Fig 13: Bronze horse-shaped artifact from the temple of Itonia Athena, Philia (KD2002) **Fig 14:** 8th c. BC bronze artifact from Olympia; Peloponnesian workshop (on display at the Archaeological Museum of Olympia) **Fig 15:** Bronze bird on perpendicular disk, late 8th – early 7th c. BC, Pherai, Thessaly (on display at the National Archaeological Museum of Athens)

nia. They appear to be a simplified version of the previous objects, having the same basic form as the first sub-category, but with rougher, undecorated straight foils. The number of meridians ranges from four to nine, the lower extension is rarely made to accommodate a pole (it is mostly flat, curved, or in some cases conical), and the top part resembles a variety of forms; birds (overwhelmingly), abstract geometrical

forms, animals (artifact from Olympia), and humans (artifact from Macedonia). Some examples from this category can be seen in figures 7-12.

The *third category* consists of artifacts that incorporate more than one sphere into their design. A representative artifact from Philia is a bronze horse-shaped object, whose legs are made of two identical spheres, with four meridians each (Fig. 13). Another

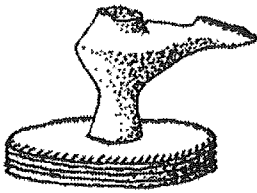


Figure 16.

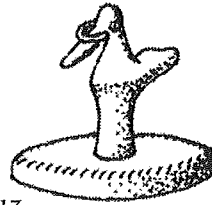


Figure 17.



Figure 18.

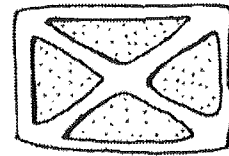
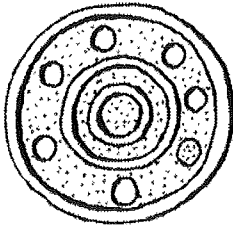


Fig 16: Bronze seal-shaped artifact from the temple of Itonia Athena, Philia; 3.3cm in height (KD2002)

Fig 17: Bronze seal-shaped artifact from the temple of Itonia Athena, Philia; 3.0cm in height (KD2002)

Fig 18: Bronze seal-shaped artifact from the temple of Itonia Athena, Philia; 4.5cm in height (KD2002)

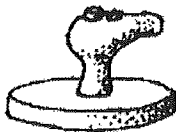


Figure 19.

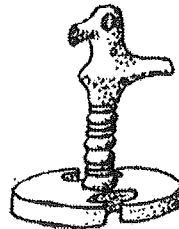


Figure 20.

Figure 21.

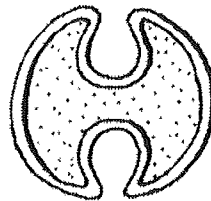
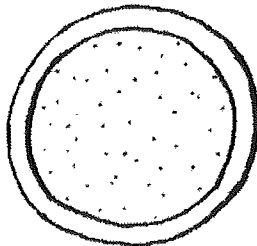
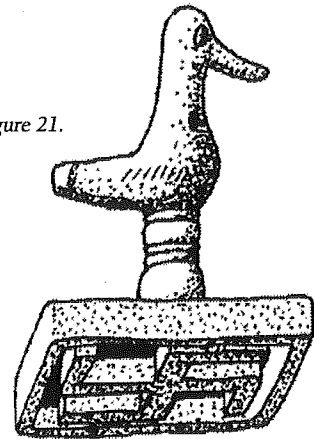


Fig 19: Bronze seal-shaped artifact from the temple of Itonia Athena, Philia; 2.3cm in height (KD2002)

Fig 20: Bronze seal-shaped artifact from the temple of Itonia Athena, Philia; 5.4cm in height (KD2002)

Fig 21: Bronze seal-shaped artifact from the temple of Itonia Athena, Philia; 4.5cm in height (KD2002)

example comes from Olympia, where a hollow bronze pole incorporates two spheres (of four meridians), before culminating in a bird-shaped protrusion (Fig. 14). In both cases the spheres are undecorated (as in the second sub-category of the previous category). In these cases the hollow sphere is no longer the core of the artifact but a simple decorative element. If there is indeed some sequence of imitations originating from an astronomically useful orig-

inal, this category represents the furthest deviation from the initial votive intent.

A number of disk-shaped bronze artifacts from Thessalian temples are on display at the Archeological Museum in Athens. In most cases the disk is undecorated, but in one artifact (Fig. 15) it is adorned with 17-18 star symbols, identical to the ones on the spherical objects already mentioned. The density and regular positioning of the symbols pre-

cludes the idea that they might have represented some form of star map. They are, most likely, just a star-themed decoration.

Another group of bronze offerings, similar to the spherical ones and with possible astronomical allusions, are the seal-shaped or disk-shaped artifacts. As with the spherical variety, there is a bird-shaped upper part. In these cases, however, it is attached to a flat lower segment, at an angle that varies from zero to ninety degrees.

The artifacts from the temple of Itonia Athena with the upper part perpendicular to the lower part (seal-shaped) are displayed in figures 16-20. In all cases the bottom of the lower segment has a relief, perhaps used as an actual seal. In the first artifact, the relief consists of three concentric circles, the outer one delineating the seal's border. Between that and the two inner circles there are seven circular holes, one of them not completely punched through. It is possible that the circles may represent the known planets around the earth, the Pleiades, or nothing of astronomical context. The second seal has an elaborate geometrical relief of semicircles forming what appears to be a double axe symbol. The double axe had been a popular symbol of power among the Minoans and the Mycenaeans, and continued to be so, throughout the next millennium, all over Greece. The third seal has a simple 'X' pattern, while the top of the lower segment is engraved with zigzag lines. The fourth seal is a curious artifact, in that the seal relief is an empty circle. The fifth seal is shaped like a Boeotian shield (also reminiscent of a double axe, or an abstract rendering of the waxing and waning of the moon).

A more unusual seal-shaped artifact is the one in Fig. 21. In this case, the upper part is tilted at an angle of approximately 45°, a unique feature among the artifacts studied. The seal relief is a clockwise swastika (depicted counter-clockwise if used as a seal), a common Indo-European symbol that has been theorized by Carl Sagan (Sagan & Druyan, 1985) to be associated with comets (in accordance with ancient depictions of comets in the form of a swastika).

Discussion

The great diversity within the not-so-great quantity of astronomically linked votive artifacts is a testament more to our ignorance of the particulars of that time period, than to any new insight obtained through parallelism and conjecture. Most of the decorative themes that characterize these artifacts can also be seen in various artistic designs that have no apparent connection with astronomy (e.g. the dotted circle (sun symbol) was widely used to fill empty spaces in Geometric Age pottery), though an initial celestial influence should not be automatically dismissed. Written documents in that era were scarce, and only the more popular of the first epics have survived to this age. Through these epics, fragments of astronomical wisdom stare back at us in artistic purity, detached from the prosaic details of their discoveries and the means used by those who studied them. The birth of natural philosophy overshadowed the more empiric achievements of the multitude of celestial observers of past aeons, to the effect that Eudemos (a pupil of Aristotle), in his work 'the History of Astronomy' wrote that Thales was the first man who undertook the study of astronomy. In the Geometric age, the study of the stars was probably conducted by priests, men whose inclination was the drafting of practical calendars and not scientific curiosity, and whose names were not recorded in history books. The artifacts presented here may shed some dim light into that dark period (made all the darker in contrast to the more documented centuries that followed), if the assumptions made about their decorative origin are correct.

References

- Ιστορία του Ελληνικού Έθνους, τόμος Α' (History of the Greek Nation. Volume I) (1976) Εκδοτική Αθηνών (in Greek).
- Kilian-Dirlmeier, Imma (2002) *Kleinfunde aus dem Athena Itonia-Heiligtum bei Philia (Thessalien)*, Mainz, Verlag des Römisch-Germanischen Zentralmuseums, Bonn.
- Pilali-Papasteriou, A. and Papaevthymiou-Papastamou, A.

(1983) Νέα ανασκαφική έρευνα στο ιερό της Φίλιας (New excavational research at the sanctuary of Philia). *Anthropologica* 4, 1983, 49-68 (in Greek).

Sagan, C. and Druyan, A. (1985) *Comet*, Random House, New York.

van Straten, F.(1992) Votives and votaries in Greek sanctuaries. In: O. Reverdin and B. Granke (Eds.), *Le sanctuaire Grec. Entretiens sur l'antiquité classique*, Fondation Hardt 37 (Genf 1992) 247-284.